

Attorney Docket: 1302-59**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANT: Richard Paul Eckberg      EXAMINER: Susan W. Berman

SERIAL NO.: 10/721,394      GROUP ART UNIT: 1711

FILED: November 25, 2003      DATED: November 14, 2006

FOR: **NOVEL SHELF-STABLE PHOTOCURABLE  
SILICONE COATING FORMULATIONS**

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Commissioner for Patents  
P.O. Box 1450  
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**DECLARATION**

I, Dr. John Kilgour, hereby declare and say as follows:

1. I received my Ph.D. from Iowa State University in 1975 and am presently a release Coatings Product Development Chemist at General Electric Advanced Materials, 260 Hudson River Road, Waterford, New York, 12188;

2. I am familiar with the subject matter claimed in U.S. Patent Application No. 10/721,394 filed November 25, 2003 and the specification filed therewith. Further I have studied and am familiar with the prior art cited in the Office Action mailed May 15, 2006, namely, U.S. Patent No. 5,814,679 (herein "Eckberg et al.") and U. S. Patent No. 5,010,118 (herein "Desorcie");

3. The present invention provides an ultra-violet or electron beam curable silicone coating composition comprising an epoxy-terminated linear silicone of preferred chain length, bearing reactive functional groups at the chain-stopper position and substantially no epoxy functional groups along the backbone of the polymer chain, a carbinol functional silicone, an alkylphenol additive and compatible iodonium salt photocatalysts.

The novel silicone compositions provide unexpectedly stable photocurable compositions that can be readily applied to conventional substrates;

4. Eckberg et al. teaches the use of polycarbinol-stopped linear polydimethylsiloxane additives with various epoxysilicone polymers, including epoxy stopped telechelic structures, as a means of providing superior release properties versus those obtained without the carbinol-stopped polymer presence. Eckberg et al. does not provide or disclose any data to shelf stability or thermal stability of catalyzed coatings;

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5. Descorcie teaches the use of alkyl phenol additives for the promotion of superior miscibility of polar onium salt catalysts in non-polar epoxysilicone media without reference to shelf stability or thermal stability of the complete coating composition;

6. To provide comparative examples which are the closest teaching of Eckberg et al., i.e., a comparative example containing terminal epoxy groups and only one epoxy functional group along the polymer backbone and a compatibilizer, I prepared Comparative Examples P, Q and R as follows: First, hydride fluid Z1 ( $M^H D_{22} D^{H1} M^H$ ) was prepared by combining 100 grams (0.338 moles) of octamethylcyclotetrasiloxane, 3.68 grams (0.0153 moles) of tetramethylcyclotetrasiloxane and 8.23 grams (0.0614 moles) of tetramethyldisiloxane in a flask. 1.12 grams of Filtrol catalyst was added. The reaction mixture was heated to 80°C for four hours. The Filtrol was removed by filtration. An epoxy functional fluid Y1 ( $M^{epoxy} D_{22} D^{epoxy1} M^{epoxy}$ ) was prepared with 100 grams of hydride fluid Z1 and 1.74 grams of a Rhodium solution, enough to deliver 5 ppm Rhodium to the reaction solution. The solution was heated to approximately 90°C, and 18.4 grams of vinylcyclohexeneoxide was added drop wise. The reaction was held at 90°C for four hours and the product isolated;

7. The following mixtures of the control epoxypolysiloxane (i.e., Comparative Examples P, Q and R) solutions were prepared, and the initial viscosities measured as presented in Table I;

**TABLE 1:**

Comparative Examples:	Polymer Y1 pphp	<sup>1</sup> Polymer B pphp	<sup>2</sup> Additive C pphp	<sup>3</sup> Photocatalyst Solution D pphp	Blend Viscosity
P	100	0	0	1	70
Q	98	0	2	1	75
R	93	5	2	1	90

<sup>1</sup> Polymer B was the same as used in the instant application; <sup>2</sup> Alkylphenol Additive C was the same as used in the instant application; <sup>3</sup> Photocatalyst Solution D was the same as used in the instant application.

8. Shelf life Stability Test, as described in U.S. Patent Application No. 10/721,394,

was performed on Comparative Examples P, Q and R. The samples were placed in an oven at the designated temperatures and out of contact with light. The samples were checked daily for viscosity measurement or gel formation. The results are displayed below in Tables 2 and 3, respectively;

9. The instant application presented results for 40°, 60° and 70° C aging tests. Aging tests of Comparative Examples P, Q and R were performed at 60° and 70° C due to time considerations. However, when the results of Comparative Examples P, Q and R are extrapolated to lower temperatures the difference in shelf life is significant;

**TABLE 2: 60°C Shelf life (Viscosity Build) (cps, Brookfield)**

Comparative Examples:	Initial Viscosity	1 day	<4 days
P	70	gel	
Q	75	gel	
R	90	110	gel*

\*no measurements made on days 2 and 3

TABLE 3: 70°C Shelf life (Viscosity Build) (cps, Brookfield)

Comparative Examples:	Initial Viscosity	1 day
P	70	gel
Q	75	gel
R	90	gel

10. Comparative Examples P, Q and R gel in one day, with one exception at 60°C which is faster than the Examples C, E and G of the instant application which range from 4 to 9 days depending on the test and formulation. According, the comparative testing set forth herein clearly documents epoxy functional polysiloxanes containing both terminal epoxy groups, a single pendant (internal) epoxy functional group and an alkylphenol compatibilizer is significantly less stable than the presently claimed invention containing only terminal epoxy groups. Thus, the shelf life of the epoxypolysiloxane containing a single pendant group is significantly shorter than the epoxypolysiloxane containing only terminal groups;

11. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further these statements are made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and such willful false statement may jeopardize the validity of the application or any patent issued thereon.

11/14/2006  
Date

John A. Kilgour  
Dr. John Kilgour